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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,795	07/30/2003	Nickolaos Pilatis	84800 3017 KAW	9410

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WASHINGTON, DC 20036-3307

EXAMINER	
KIM, TAE JUN	
ART UNIT	PAPER NUMBER
3746	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/629,795	PILATIS ET AL.	
	Examiner	Art Unit	
	Ted Kim	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/27/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 22* is/are pending in the application.

4a) Of the above claim(s) *4, 6, 11-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7-10,16-20 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features of claim 19 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 18, 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. "the surface" lacks proper establishment of which surface is referred to, as claim 1 references both inner and outer flow surfaces.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 17, 19, 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Hellat et al (4,781,030). Hellat et al teach a prefilmer for a fuel injection arrangement comprising an annular member 4b and 4a together having radially inner and radially outer fluid flow surfaces a fluid flow surface and a downstream edge near element number 11, the prefilmer being arranged so that when working in operative association with the fuel injection arrangement fuel 6 flows over one of the surfaces to the downstream edge, from where the fuel is shed, and air 7 flows radially inwardly and radially outwardly [note that air is directed to holes 11 for cooling – see Fig. 4] of the prefilmer 4b, 4a characterised in that the prefilmer further comprises a fluid flow mixing

means [curved sheets] disposed on the surface over which the fuel flows to enhance the mixing of fuel and air; characterised in that the prefilmer is generally annular; characterised in that the surface is an outer surface of the prefilmer (the flow 6 is at a surface which is an outer surface relative to the center of fuel injector device, see e.g. Fig. 4) and the fluid flow mixing means is disposed to the outer surface; a gas turbine engine comprising a fuel injection arrangement.

6. Claims 1-3, 7-10, 17, 18, 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Willis et al (5,151,608). Willis et al teach a prefilmer for a fuel injection arrangement comprising an annular member 11 having radially inner 13 and radially outer fluid flow surfaces a fluid flow surface and a downstream edge, the prefilmer being arranged so that when working in operative association with the fuel injection arrangement fuel 20, 33 flows over one of the surfaces to the downstream edge, from where the fuel is shed, and air from 21, 26 flows radially inwardly and radially 31 outwardly of the prefilmer characterised in that the prefilmer further comprises a fluid flow mixing means, vanes 32, disposed on the surface over which the fuel flows to inherently enhance the mixing of fuel and air; characterised in that the fluid flow mixing means comprises projections 32 extending generally downstream from the downstream edge 30 (col. 3, lines 30-37 teach the projections 32 are attached to the downstream edge 30); characterised in that the projections are generally trapezoidal in shape; characterised in that projections are radially inwardly angled from 29; characterised in that the projections are radially outwardly angled from 11; characterised in that the projections 32

are alternately radially inwardly and outwardly angled from 29 and 11; characterised in that the angle of the projections is between 0 and 45 degrees relative to an injector axis; characterised in that the prefilmer is generally annular; characterised in that the surface is an inner surface of the prefilmer and the fluid flow mixing means is disposed to the inner surface; a gas turbine engine comprising a fuel injection arrangement.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-3, 5, 7-10, 17, 18, 20, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shekleton (4,470,262) in view of Joshi et al (5,638,682) and Joshi et al (5,251,447). Shekleton teaches a prefilmer for a fuel injection arrangement (see e.g. Figs. 4, 7) comprising an annular member 206 having radially inner 216 and radially outer 214 fluid flow surfaces and a downstream edge near 216, the prefilmer being arranged so that when working in operative association with the fuel injection arrangement fuel flows over one of the surfaces to the downstream edge near 216, from where the fuel is shed, and air flows through 210 and e.g. 222 radially inwardly and radially outwardly of the prefilmer. Shekleton do not teach the use of a flow mixing means disposed on the surface on which the fuel flows. Joshi et al '682, in combination with the incorporated by

reference (see col. 2, lines 45-48; col. 3, lines 13-17) Joshi et al 5,251,447 patent, teach a prefilmer for a fuel injection arrangement of a gas turbine engine comprising a body having a fluid flow surface 38 and a downstream edge, the prefilmer arranged so that when working in operative association with the fuel injection arrangement fuel from 65 (see the Joshi '447 patent and note that the fuel is liquid) flows over the surface to the downstream edge, from where the fuel is shed, characterised in that the prefilmer further comprises a fluid flow mixing means (slots 70 or the portions of 36 between the slots) to, in use, enhance the mixing of fuel and air; characterised in that the fluid flow mixing means comprises projections (the portions between the slots) extending generally downstream from the downstream edge; characterised in that the projections are generally trapezoidal in shape (see e.g. Figs. 4, 5); characterised in that projections are radially inwardly angled (see Fig. 5 the portions between the slots); characterised in that the projections are radially outwardly angled (see portion 75 of slots 70; characterised in that the projections are alternately radially inwardly and outwardly angled (alternating the portions between the slots are radially inwardly and the portions 75 of the slots are outwardly angled); characterised in that the prefilmer is generally annular; characterised in that the surface is an inner surface of the prefilmer and the fluid flow mixing means is disposed to the inner surface; characterised in that during low fuel flows the fluid flow mixing means enhances the mixing of fuel and air and inherently provide regions of rich and lean fuel/air mixtures. The projections serve to energize the recirculation hot gases in the combustor and increase the damping of the dynamic pressures and acoustic noise

generated (col. 4, lines 36-67). Note that the flow patterns of Joshi et al are highly analogous to the recirculating flow of Shekleton. It would have been obvious to one of ordinary skill in the art to employ the projections on the prefilmer portion of Shekleton receiving the fuel, as taught by Joshi et al, in order to energize the recirculation hot gases in the combustor and increase the damping of the dynamic pressures and acoustic noise generated.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over any of the above applied art in view of Larson et al (4,284,170). The above prior art teaches projections but not those which are asymmetrically spaced. Larson et al teach an asymmetric arrangement of the projections 16 is well known in the art and destroys the unsteady pressure field when two flow streams commingle (see abstract). It would have been obvious to one of ordinary skill in the art to employ an asymmetric arrangement of the projections in order to enhance mixing and/or destroy the unsteady pressure field when two flow streams commingle.

Response to Arguments

10. Applicant's arguments filed 12/27/2006 have been fully considered but they are not persuasive. Applicant's arguments rely on the new limitations added by amendment. These new limitations have been addressed above.

11. Applicant's arguments concerning Larson are not persuasive, as Larson specifically teaches one of ordinary skill that an asymmetric arrangement of the projections 16 is well known in the art and destroys the unsteady pressure field when two

flow streams commingle (see abstract). Compare with the teachings of Joshi et al where the projections serve to energize the recirculation hot gases in the combustor and increase the damping of the dynamic pressures and acoustic noise generated (col. 4, lines 36-67). Hence, both Larson and Joshi are concerned with the problem of mixing and the noise generated due to mixing and one of ordinary skill in the art would be motivated to look in the noise reduction art of Larson to solve the substantially similar problems encountered by e.g. Joshi et al. Furthermore, it is noted that the projections are already known in the art, and that Larson is merely cited to show the *asymmetric* arrangement of projections and its function. Hence, claim 16 as a whole would be fairly taught by the combination above.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached at 571-272-4828. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm

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